Worksheet

Topics: Mole concept, Avogadro Number
Part -1

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Chemistry Affinity
Conceptual, Real World, Happy Learning

Problems based on Mole concept, Avogadro number

1. How many moles is 12.044×10^{23} atoms of He?

2. Calculate the mass of 6.022×10^{23} molecule of Calcium carbonate ($CaCO_3$).

3. An atom of some element M weighs 6.644×10^{-23} g. Calculate the number of gram-atoms (mole) in 40 kg of it.

4. If 1.4 g of calcium oxide is formed by the complete decomposition of calcium carbonate, then what will be the amount of calcium carbonate taken and the amount of carbon di oxide will be formed?

5. If 2 mol of Calcium Carbonate (Formula Weight =100) occupies a volume of 67.0 ml, Find the density ?

6. A metal M of atomic mass 54.94 has a density of 7.42g/cc. Calculate the apparent volume occupied by one atom of the metal.

7. Calculate the total number of electrons present in 3.2 g of CH_4.

8. Find the total number of neutrons present in 7 mg of ^{14}C atoms.

9. At room temperature, the density of water is 1.0 g/mL and the density of ethanol is 0.789 g/mL. What volume of ethanol contains the same number of molecules as are present in 175 mL of water?

10. Chlorophyll the green colouring matter of plants responsible for photosynthesis contains 2.68% of Magnesium by weight. Calculate the number of magnesium atoms in 4 g of Chlorophyll [Mg =24]

11. If a mole were to contain 1×10^{24} particles, what would be the mass of (i) one mole of oxygen, and (ii) a single oxygen molecule?

12. Calculate the number of moles of 24.088×10^{23} numbers of sodium atom

13. Among the following, choose the ones with equal number of atoms.

A. 212 g of Na_2CO_3 (s) [molar mass = 106 g]

B. 248 g of Na_2O (s) [molar mass = 62 g]

C. 240 g of NaOH (s) [molar mass = 40 g]

D. 12 g of H_2(g) [molar mass = 2 g]

E. 220 g of CO_2(g) [molar mass = 44 g]

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Choose the correct answer from the options given below:

(1) A, B, and C only (2) A, B, and D only (3) B, C, and D only (4) B, D, and E only

14. Which of the following contains the greatest number of atoms?

A. 1 g butane, B. 1 g nitrogen, C. 1 g silver, D. 1 g of water

15. Which sample contains the largest number of atoms?
A. 1 mg butane (C_4H_{10}), B. 1 mg nitrogen, C. 1 mg sodium, D. 1 mg of water

16. How many mole of magnesium phosphate will contain 0.25 mole of oxygen atoms?

17. Which has more number of atoms, 100 grams of sodium or 100 grams of iron (Atomic mass Na = 23 u, Fe = 56 u)

18. Calculate the number of molecules of sulphur (S_8) present in 16 g of solid sulphur.

19. If one mole of carbon atoms weighs 12 g, what is the mass (in grams) of 1 atom of carbon?

20. Match List - I with List - II.

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	List 1: mass of substance		List II: number of atoms
A	1.8 mg water	I	2 x 10-4 x N_A
B	9.8 mg sulphuric acid	II	1.5 x 10-4 x N_A
C	1.8 mg carbon	III	3 x 10-4 x N_A
D	5.85 mg salt (NaCl)	IV	7 x 10-4 x N_A

A. A-IV, B-III, C-I, D-II

B. A-III, B-II, C-IV, D-I

C. A-III, B-IV, C-II, D-I

D. A-III, B-IV, C-I, D-II

21. Which of the following contain the same number of atoms? Given: Molar mass in g/mol of H, He, O and S are 1, 4, 16 and 32 respectively.

A. 2 g of O_2 gas, B. 4 g of SO_2 gas, C. 1400 mL of O_2 at STP, D. 0.05 L of He at STP, E. 0.0625 mol of H_2 gas

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Choose the correct answer from the options given below :

A. A and B only

B. B and C only

C. C and D only

D. A, C and E only

22. What volume of hydrogen gas at STP would be liberated by action of 50 mL of sulphuric acid of 50% purity (density = 1.3 g/mL) on 20 g zinc? Given: Molar mass in g/mol of H, O, S and Zn are 1, 16, 32 and 65 g/mol respectively.

A. 5.824 L, B. 7.428 L, C. 6.892 L, D. 8.375 L

JEE main 2026 (5 th April)

All the Best


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H
H
H